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Adult Myrmecophily in Butterflies: the Role of the Ant  
*Anoplolepis longipes* in the Feeding and Oviposition Behaviour  
of *Allotinus unicolor* (Lepidoptera, Lycaenidae)

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**Abstract** Adults of the South-East Asian lycaenid butterfly *Allotinus unicolor* search for trophobiotic homopterans associated with a particular ant species, *Anoplolepis longipes*. The butterflies settle down for feeding in such associations after a characteristic pre-alighting ("examination flight") and appeasement ("proboscis palpation") behaviour. Preimaginal instars of *A. unicolor* were always related with the same ant species as well. *A. unicolor* uses a wide range of homopterans for oviposition. The orientation mechanisms for specific ant recognition (probably visual and olfactory), the selective value of specific ant-associations for Miletinae butterflies, the consequences of such strategies for the larval food range, and the evolution of adult myrmecophily within the genus *Allotinus* are discussed.

**Key words** Lycaenidae, Formicidae, myrmecophily, myrmecoxeny, ant specific relationships.

### Introduction

In general, ants are important predators of butterflies and, especially, of their larvae (e.g. WARRINGTON & WHITTAKER, 1985; JONES, 1987). Most butterflies and caterpillars try to escape when they encounter ants. The main exception are the myrmecophilous species, and within the Lepidoptera the family Lycaenidae is the most species-rich group of myrmecophiles. Myrmecophily of lycaenid larvae and pupae has been intensively studied throughout the past 200 years (reviews see WARNECKE, 1932/1933; HINTON, 1951; MALICKY, 1969; COTTRELL, 1984), revealing a fascinating complex of trophobiotic, parasitic, and commensal relationships between lycaenid preimaginals and ants (MALICKY, 1969; PIERCE, 1983; PIERCE & YOUNG, 1986; FIEDLER & MASCHWITZ, 1988a). To date, the physiology of lycaenid myrmecophily is not yet completely understood, but it has become obvious that lycaenid immatures are even able to break into the chemical communication systems of ants by releasing brood-carrying or recruitment behaviour, by alerting their attendant ants, or by following the ants' pheromone trails (HENNING, 1983; FIEDLER & MASCHWITZ, 1988b, 1989).

In contrast to our relatively good knowledge of such preimaginal myrmecophily of Lycaenidae, only few cases of interactions between lycaenid adults and ants have been reported or even studied in detail. ATSATT (1981), HENNING (1983), COTTRELL (1984), and PIERCE & ELGAR (1985) reported a number of species whose females use the

presence of ants as oviposition cue. These butterfly species maintain either trophobiotic or kleptoparasitic relationships to ants, and the survival of the larvae of most of them seems to depend completely on the ants: the larvae either feed on ant brood, or they are protected against parasitoids or predators by the ants and cannot exist without them (PIERCE & MEAD, 1981; PIERCE & ELGAR, 1985; PIERCE & EASTSEAL, 1986). Thus, these lycaenids are termed obligate myrmecophiles and there is strong evidence that females of such species are able to recognize their specific host ants, probably by a combination of optical and olfactory stimuli.

In facultatively myrmecophilous species (whose larvae are not fully dependent on ants) or myrmecoxenous lycaenids (whose larvae are not associated with ants at all) ant-related behaviour of the imagines has not yet been reported. Only the observations of ROEPKE (1919) and MASCHWITZ *et al.* (1988) indicate that in two homopterophagous *Miletus* species (subfamily Miletinae) specific associations of the larvae and possibly the adults with members of the ant genus *Dolichoderus* might occur. We here present the first direct observations of ant-related behaviour of lycaenids outside the ecological group of the obligate myrmecophiles: the myrmecophilous behaviour of adults of the Miletinae species *Allotinus unicolor* C. & R. FELDER, 1865. This South-East Asian butterfly is associated with one single ant species, *Anoplolepis longipes* JERDON, 1857 (Formicidae, Formicinae).

## Study Area

The observations were conducted in the Gombak valley (20 km north of Kuala Lumpur) in the vicinity of the Ulu Gombak Field Studies Research Centre (UGFSRC) of the University of Malaya (Malaysia). There we found a colony of *A. unicolor* along a logging path at an altitude of about 400 m. The vegetation of the area was mainly an advanced secondary forest, near the logging path containing especially bamboo (mainly *Gigantochloa scortechnii*) and a number of pioneer plants typical for the plant successions of tropical waysides (*Melastoma malabaricum*, several *Macaranga* species, *Mallotus* etc.).

We visited the colony on 7 days between the January 17th and February 16th 1988. The earliest observations were made at 09.00, the latest at 18.00 local time. Our main objective was to record quantitatively the occurrence of preimaginal instars of *A. unicolor* and the behavioural reactions of adults of this species towards ants.

## Results

### 1. Adult searching behaviour

*Foraging flights*: Both males and females fly erratically through the vegetation, usually at a height of 0.5–3 m above the ground. Where possible, they follow landmarks, e.g. the edges of dense vegetation along the waysides. After having intensively examined one bush or bamboo, the butterfly rather directly flies to the next one, obviously preferring dark silhouettes for orientation. This type of flight does not

Table 1. Behavioural reactions of *Allotinus unicolor* adults (both sexes) towards trophobiotic associations of ants. Given are the absolute frequencies of the behaviours observed.

	Examination flight	Landing	Feeding	Proboscis palpation	Resting
foraging <i>A. longipes</i>	2	2	0	0	0
<i>A. longipes</i> +extrafloral nectary	1	1	0	0	0
<i>A. longipes</i> +tortricid larvae	15	14	0	0	0
<i>A. longipes</i> +homopterans	80	78	28	26	0
other ants +homopterans	3	0	0	0	0
leaves without ants	0	0	0	0	34

differ from the foraging flights of many other butterflies.

Foraging flights were observed throughout the day, but adult activity was lowest around noon when the weather was sunny and very hot ( $>30^{\circ}\text{C}$ ). During rain showers no flights were observed. A peak of activity was on the late afternoon between 16.00 and 18.00 local time.

*Examination flights* : When a butterfly comes near a branch or twig occupied by ants, the flying pattern changes remarkably : the butterfly flutters characteristically along and around the twig, often for 30 – 60 seconds, flying slowly in a nearly constant height above the ground. These “examination flights” are characterized by 1) the special, “fluttery” appearance, 2) the intensive circling of one particular twig, and 3) the lack of the erratic zig-zagging which is typical for the normal foraging flight (see also MASCHWITZ *et al.*, 1985). We never observed examination flights at sites where no ants were present.

During the examination flights the *A. unicolor* adults approach the twig to a distance of only 2 – 5 cm, thus coming sufficiently close to recognize the ant species present on the twig, probably using olfactory stimuli. Most of the locations searched intensively during examination flights are trophobiotic associations of several ant species with homopterans, but also ants visiting extrafloral nectaries or tortricid larvae. Sometimes even single foraging ants are examined in this way (Table 1).

## 2. Landing

Landing of the adults occurs after examination of an ant-visited twig: the butterfly settles down near the ant-tended homopterans, usually at a distance of 5 – 10 cm ; this happened after more than 95% of the examination flights. In most cases the butterfly flies to the twig from beneath and then sits in a “hanging” position on the underside of the twig, or – e.g. on upright bamboo stems – with the body axis parallel to the stem. Only in one occasion we observed a male sitting in upright position within a homopteran association.

We never observed any landings at homopteran colonies tended by ants other than *Anoplolepis longipes*, though other ant species were present and partially abundant at the observation site. This includes, for instance, the dominant ant species *Oecophylla smaragdina* FABRICIUS, 1793 and one *Crematogaster* species which were both abundant at the study site. On one occasion we watched a male *A. unicolor* examining 3 twigs of bamboo, each densely populated by an aphid species which was tended by the *Crematogaster* species. After examining for about 2 minutes the butterfly left the bamboo without landing, although the aphid species was an adequate food resource for either the adults (honeydew) or the larvae (aphids). Indeed, we found adults of *A. unicolor* landing and feeding in aphid colonies of the same species, when they were tended by *A. longipes*. We also observed eggs and larvae of *A. unicolor* in such aphid colonies. Thus, the rejection of the *Crematogaster*-tended aphids was certainly due to the presence of an inadequate ant species.

On nearly all occasions when a butterfly had examined an ant-attended homopteran colony it landed after 1–2 minutes if no other disturbance occurred. We observed no landings without a preceding examination flight.

### 3. Landing sites

Because Miletinae adults feed on homopteran honeydew instead of floral nectar, it was not surprising that *A. unicolor* butterflies landed preferably in homopteran aggregations. Unexpected, however, were our observations on a considerable number of landings of the butterflies also in associations of ants with trophobiotic tortricid larvae (cf. MASCHWITZ *et al.*, 1987) and even a few near ants at extrafloral nectaries or no carbohydrate source at all. In all cases, *A. longipes* was the only ant species present at the landing site, and the typical examination flight preceded the landing (Table 1). Hence, the ants seemed to be the most important stimulus for landing, while the presence of food resources or oviposition places was of lower significance. To test this, we tried to establish ant trails by feeding *A. longipes* with freshly killed grasshoppers (Saltatoria). This ant species performs effective mass recruitment and within 10 minutes or less the grasshoppers were visited and carried away by dozens of *A. longipes* workers. But we failed to induce examination flights or landing reactions of *A. unicolor*, possibly because the number of active ants was too high on these trails.

### 4. Feeding

After landing, the butterflies walk to the homopteran colony. When they are discovered by the ants, they palpate the butterfly, especially the legs and the head, but do not behave aggressively towards it. The butterfly responds to this by a unique behaviour: it stretches out its proboscis and strokes the ants' antennae with it, thus performing a kind of palpation behaviour similar to the antennal communication between worker ants. This "proboscis palpation" has apparently been overlooked by former observers. Subsequently the ants sometimes crawl up the legs or even the wings, but never show aggressiveness: we failed to detect any biting or alarm reactions in the ants.

Table 2. Numbers of eggs and larvae of *Allotinus unicolor* in trophobiotic associations of *Anoplopepis longipes* with homopterans.

Trophobiont	Eggs+eggshells	Larvae
aphid 1	46	12
aphid 2	12	3
aphid 3	35	3
aphid 4	4	4
2 membracid sp.	3	0
psyllid	1	0

Table 3. Numbers of eggs and larvae of *Allotinus unicolor* on several plant species.

Plants	Eggs+eggshells	Larvae
<i>Gigantochloa scortechinii</i>	58	15
<i>Achasma</i> sp.	35	3
<i>Melastoma malabaricum</i>	7	4

After this sequence of "appeasement" behaviour, the butterfly walks into the homopteran colony and releases honeydew excretion by palpating the homopterans with its proboscis (Table 1). This "milking" has been described in detail by other authors (e.g. KERSHAW, 1905; MASCHWITZ *et al.*, 1985). *A. unicolor* sometimes stays in the homopteran aggregations for more than 15 minutes.

### 5. Oviposition sites and larval host specificity

We did not observe the oviposition behaviour directly, but we found a number of eggs, eggshells, and larvae of *A. unicolor*. We confirmed the identity of some larvae by rearing them to the adult stage. All preimaginals with the exception of two eggs were associated with *A. longipes*. One of these two eggs was found in an aphid colony visited by the myrmicine ant *Meranoplus mucronatus* SMITH, 1857, but on the neighbouring twig of the same plant (*Melastoma malabaricum*) *A. longipes* was also present. The other egg was detected within a hormaphid colony on a Zingiberaceae plant attended by a *Technomyrmex* species. However, when we inspected the same plant several days before, it had been occupied by *A. longipes*. So both eggs were probably deposited in the presence of *A. longipes* as well.

In contrast to this extraordinarily high ant specificity at oviposition, the range of homopterans as hosts was unusually wide. We found eggs in colonies of at least 5 aphid species, 1 psyllid, and 2 membracid species (Tables 1,2). In the latter case we observed even two membracid nymphs with an egg placed directly on them (Fig. 1). This has been described so far for only two other *Allotinus* species (KITCHING, 1987; MASCHWITZ *et al.*, 1988) and seems to be an uncommon feature for that genus with the exception of *A. major*, that has ectoparasitic larvae.

Whether all these homopterans are suitable hosts for the larvae remains unknown. We found larvae of different instars (L<sub>2</sub> – L<sub>4</sub>) only within aphid colonies of 3 species (2 on the bamboo *Gigantochloa scortechinii*, 1 on *Achasma* [Zingiberaceae]) (Table 3). Aphids were obviously preferred over other Homoptera for oviposition.

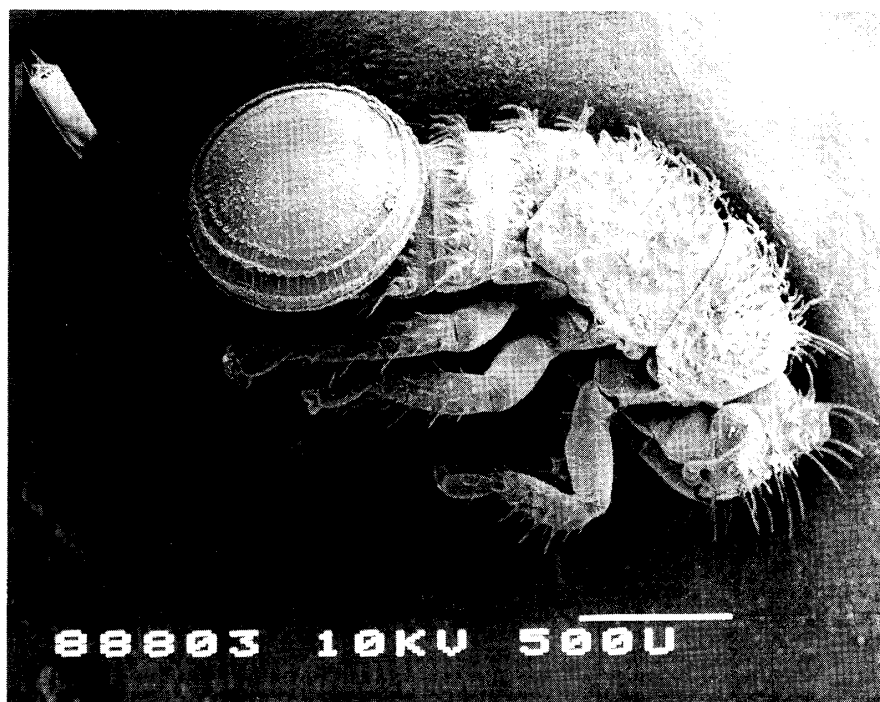


Fig. 1. SEM photograph of a membracid nymph with an attached egg of *Allotinus unicolor*. The membracid was taken from an aggregation tended by *Anoplolepis longipes*. Photograph M. RUPPEL.

When feeding upon the aphids, the larvae were not treated aggressively by the ants and were palpated or largely ignored by them, probably due to appeasement substances from specialized larval glands (the pore cupola organs, see MALICKY, 1969 ; MASCHWITZ *et al.*, 1985 and others).

## 6. Resting

The resting position of *A. unicolor* during daytime differs significantly from its landing and feeding position in *A. longipes*-tended homopteran colonies as described above. For resting, the butterfly lands on the upperside of a leaf, thus sitting with closed wings in an upright position. Usually shady places are preferred for resting. We observed no resting on twigs or leaves where ants of any species were present. Most resting places were at least 30–50 cm away from the trophobiotic associations. Hence, ants are not used as cues for resting sites. We do not know where *A. unicolor* roosts during the night.

## Discussion

### a) *Mechanisms of ant recognition*

Our observations show that at least two important elements of the adult behaviour of *A. unicolor* (feeding and oviposition) are greatly influenced by the ant species *Anoplolepis longipes*. This suggests that it is of particular importance for these butterflies to find and recognize the adequate ant species. We assume that *A. unicolor*

uses two orientation strategies to face this problem. The first one is the erratic foraging flight that may allow the detection of ant aggregations in the vegetation with the help of visual cues. After having located some ants (or ant-tended homopterans), the adults subsequently perform the examination flights whose function might be the recognition of the ant species involved, possibly using olfactory features. Similar orientation patterns have been described for the pre-alighting flight phase of the Australian trophobiotic myrmecophilous lycaenids *Ogyris amaryllis* and *Jalmenus evagoras* (ATSATT, 1981; PIERCE & ELGAR, 1985), but are here reported for the first time for a lycaenid species with non-symbiotic myrmecoxenous larvae lacking a dorsal nectar organ and tentacular organs (see KITCHING & LUKE, 1985; KITCHING 1987). Our hypothesis concerning the existence of ant-specific relationships within the homopterophagous Miletinae (MASCHWITZ *et al.*, 1988) is thus strengthened by direct observations of adult behaviour.

The physiology of the orientation behaviour is still unknown. Further experiments are needed to test whether both optical and olfactory stimuli are indeed involved. If olfactory cues are concerned with ant recognition, the question arises which chemicals may be used. Because of the ant-specificity observed specific chemicals (e.g. trail pheromones of the ants) may be used by the lycaenid imaginaries. Orientation by the ants' communication substances has until now only been examined in the larvae of some obligately myrmecophilous or kleptoparasitic lycaenid species (HENNING, 1983).

#### b) *Selective value of ant-specificity*

In obligate myrmecophilous or kleptoparasitic lycaenids the selective value of ant-specific oviposition is obvious: the eggs are deposited in associations of the host ant with homopterans and the larvae are protected by the ants from the first instar on, or the ants may readily adopt the young larvae. In contrast, the selective value of ant-specific feeding and oviposition in a Miletinae lycaenid whose myrmecoxenous larvae are independent from ants is not as clear. The myrmecophilous behaviour of *A. unicolor* adults also differs from the similar patterns of most myrmecophilous lycaenids in that both sexes show this ant-specificity. This pattern has been described so far only for the myrmecophilous lycaenid *Jalmenus evagoras*, whereas in other lycaenids only the females respond to the presence of ants (PIERCE & ELGER, 1985). We propose here some hypotheses concerning the selective value of ant associations for Miletinae lycaenids which should be tested in further research.

1) Ants are – especially when maintaining trophobiotic associations with homopterans and thereby moving actively – much more conspicuous than rather cryptic aphids, psyllids, or membracid nymphs alone. Thus, Miletinae adults are much more likely to succeed in finding homopterans for both feeding and oviposition when they use ants as cues for such associations. This strategy, however, does not imply any ant-specificity and may apply to a number of homopterophagous lycaenids. Only optical orientation would be necessary for this kind of adult myrmecophily.

2) Ants show particular aggressiveness within their trophobiotic associations by

defending their symbiotic partners (e.g. ECKLOFF, 1976). Animals which enter into trophobiotic associations have to overcome this aggressiveness. Miletinae butterflies probably use appeasement allomones (of hitherto unknown origin and composition) for this purpose (MASCHWITZ *et al.*, 1985). In *A. unicolor* additionally tactile communication, the "proboscis palpation", seems to be involved in the sequence of appeasement behaviours. The assumption is rather likely that such appeasement mechanisms are more effective when they are specifically adapted towards only one ant genus or species, as other ants may react to the same chemical or tactile stimuli in a totally different way. Thus, specialists living together with one ant species could be more successful in areas where the adequate ant is abundant than generalists with a wider range of host ants, but a higher risk of ant attacks. In our study area, indeed, *A. unicolor* was the most common Miletinae species, and *A. longipes* was one of the most abundant ants there, too.

3) Ant-trophobiont associations are used by some Miletinae species as mating locations or as roosting places at night (*Logania* and *Miletus*, see MASCHWITZ *et al.*, 1988). The selective values of these habits are different: ants may provide conspicuous and useful cues for finding sexual partners, and roosting inmidst ants at night could lower the risk of predation in times when the butterflies are not able to escape by flying. During daytime the butterflies fly away if they are disturbed and thus ants certainly play no role in protecting them.

c) *Wide larval food range – a consequence of ant specificity?*

When a Miletinae butterfly relies on one ant species only in finding homopteran colonies as oviposition locations, it will encounter a number of different aphids, psyllids, and membracids. Two possible strategies can start from this situation: the female may search further for specific homopterans as larval food, or the larvae have to broaden their food range and accept what is present. *A. unicolor* possibly has adopted the second strategy, as we found eggs near 5 aphid, 1 psyllid, and 2 membracid species. Sometimes the eggs are laid even directly on membracid nymphs, a behaviour also recorded for *A. subviolaceus* C. & R. FELDER, 1865, *A. major* C. & R. FELDER, 1865, and some African Miletinae species (COTTRELL, 1984; KITCHING, 1987; MASCHWITZ *et al.*, 1988). But the African species seem to be food specialists. Although we cannot prove the polyphagy of *A. unicolor* larvae, we are convinced that this lycaenid is more a food generalist. *Miletus biggsii* DISTANT, 1884, and *M. boisduvali* MOORE are both specifically associated with ants of the genus *Dolichoderus* (MASCHWITZ *et al.*, 1988), and *A. unicolor* seems to have a similar larval nutritive strategy.

Because current knowledge of larval food ranges of the Miletinae is still fragmentary, we cannot state so far whether high ant-specificity and low food-specificity are normally correlated with each other. In obligate myrmecophilous lycaenids this seems to be true (PIERCE & ELGAR, 1985). Another point of interest is the adult food range. *A. unicolor* feeds exclusively on honeydew instead of floral nectar. We observed the feeding only in aphid colonies, but possibly also membracids and coccids are "milked" by the butterflies. Perhaps even the honeydew-like excretions of the trophobiotic



tortricid larvae (MASCHWITZ *et al.*, 1986) are used as adult food. As mentioned above, we observed the butterflies several times sitting at these tortricids, but we did not actually see them feed. Other Miletinae adults have strikingly uncommon nutrition habits, sometimes even feeding on the nectar-like secretions from the dorsal nectar organ of myrmecophilous lycaenid larvae (GILBERT, 1976), so that the additional exploitation of the tortricid larvae as carbohydrate source seems feasible.

d) *Evolution of ant-specific behaviour within the Miletinae*

We still have little information on the imaginal behaviour of Miletinae butterflies and even less reliable data on the ant species involved. As far as is known today, most Miletinae species are not specialized on particular ant species or genera that attend the homopterans the butterflies visit for feeding or oviposition. Such behaviour is most likely the plesiomorphic condition within this lycaenid subfamily.

As pointed out above, ants provide useful cues for detecting cryptic homopterans, and as a consequence Miletinae adults may have evolved searching strategies using ants as cues for suitable feeding, mating, or oviposition sites. The necessary preadaptations for this are the appeasement allomones of both larvae and adults of the Miletinae. When using ants as features modulating the behaviour, the adult butterflies become myrmecophiles *s. str.*, whereas the larvae remain myrmecoxenous: they are not attractive for ants and largely ignored.

Like the larval myrmecophily of the subfamilies Polyommatainae and Theclinae, the adult myrmecophily of some Miletinae offered the possibility to evolve ant-specific relationships. The selective value of such strategies has been discussed above. Within the genus *Allotinus*, several degrees of adult myrmecophily and larval relationships towards ants exist. Some members of the subgenus *Allotinus* (*subviolaceus* and *major*) have been found associated with the formicine ant *A. longipes* either as larva or as imago, but we do not know how these associations come about (KITCHING, 1987; MASCHWITZ *et al.*, 1988). *A. unicolor*, as shown, is related in a specific way with *A. longipes* only. Members of the subgenus *Paragerydus* have been reported to be associated with ants of the subfamily Myrmicinae (e.g. *substrigosus* MOORE, 1884), and *Allotinus* (*Paragerydus*) *apries* FRUHSTORFER, 1913 seems to have evolved into a kleptoparasite of the myrmicine ant *Myrmicaria lutea* EMERY, 1901 (MASCHWITZ *et al.*, 1988).

Thus, the genus *Allotinus* may serve as a model for understanding the evolution of adult myrmecophily in a lycaenid group most of whose larvae are myrmecoxenous. It also provides a possibility of comparing specialists' and generalists' strategies. Such considerations have so far largely been restricted to the phytophagous myrmecophilous lycaenids.

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## 摘 要

蝶の成虫の好蟻性： *Allotinus unicolor* の採餌、産卵行動におけるアシナガキアリの役割  
(Konrad FIEDLER・Ulrich MASCHWITZ)

*Allotinus unicolor* はアシナガシジミ亜科に属しており幼虫は肉食で比較的広い範囲の同翅類を食物とし、成虫は同翅類の分泌物を摂取することが知られているが、同翅類を取り巻く特定のアリ（アシナガキアリ *Anoplolepis longipes*）の存在を採餌・産卵場所の目印にしていることが明らかになった。

観察は前報（MASCHWITZ 他, 1988）と同じくクアランプールのMalaya大学Ulu Gombak野外研究センター周辺で1988年1月～2月に行った。

採餌・探索飛翔（Foraging Flight）は1日中見られたが日中よりも午後4時～6時のほうが成虫の活動性が高かった。アリを見つけると顕著に飛び方が変わり、探索飛翔で見られたジグザグがなくなってアリのいる枝に2～5 cmまで接近する確認飛翔（Examination Flight）がみられた。蝶は同翅類とともに存在するアリだけでなく、蜜源（花以外）やハマキガの幼虫を訪れたアリにも興味を示す（Table 1）。採餌・産卵のために着地（Landing）するのはアシナガアリが存在する同翅類のコロニーに限られており、他のアリがいるところには1度も着地を観察していない。着地後、蝶は同翅類のコロニーに歩いて接近する。この時アリは蝶に対して攻撃的ではなく脚や触角で接触してくるが、蝶はこれに応じて口吻を伸ばしアリの触角にふれる。このような口吻による「なだめ行動」はこれまで見逃されていたようである。産卵は直接観察できなかったが、同翅類のコロニー中に本種の卵、卵殻、幼虫などを確認した。アリの種が限定されているのとは対照的にホストとなる（と思われる）同翅類のほうは観察されただけでもアブラムシ5種、ツノゼミ2種、キジラミ1種と幅広かった（Table 2）。Fig. 1には直接体に卵を産みつけられたツノゼミの幼虫を示したが、これはむしろ例外的（2例観察されただけ）で、*Allotinus* 属全体でも直接産卵されるのは一般的ではない。

*A. unicolor* が採餌・産卵の目印としてアシナガキアリの存在を利用しているのは確実であるが、問題になるのはなぜエサとなる同翅類の種よりもアリの種が特定されているかということである。「同翅類とアリの共生関係の中に蝶が割り込むためにはアリの攻撃を避けるためのなだめ物質が必要であり、なだめ物質はアリの種が限られていた方が効果がある。結果的に *A. unicolor* の幼虫はこのアリと共生関係にある数種の同翅類を広く補食するようになった。」というのが我々の1つの仮説である。

真の好蟻性を示すシジミチョウの幼虫はアリに蜜を与える背部蜜線とtentacular器官を有するが、*Allotinus* 属の幼虫はこれを欠いており、アリにとっては興味の対象とならず無視される（客棲性）。*Allotinus* 属は幼虫が真の好蟻性の段階まで到達していないにもかかわらず成虫が好蟻性を示しており、シジミチョウ科における好蟻性の進化を考察する上でよいモデルとなっている。（文責 編集部）